

CLAIMS

What is claimed is:

- 5 1. A method of manufacturing a semiconductor device comprising:
- providing a substrate of a first conductivity type;
- forming a first region of a second conductivity type within the substrate to provide an extended drain region;
- 10 disposing a first island of field oxide at a top of the substrate within the first region;
- implanting a second region of a first conductivity type in the first region, adjacent to the first island of field oxide to balance charges in the first region;
- 15 implanting a source diffusion region and a drain diffusion region in the semiconductor device; and
- annealing the semiconductor device to diffuse the second region, the source diffusion region and the drain diffusion region.
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2. The method of claim 1 further comprising:
- applying an insulating layer over the semiconductor device, the insulating layer having a thickness less than the first island of field oxide; and
- 25 implanting the second region of the second conductivity type through the insulating layer.
3. The method of claim 1, wherein the step of forming a first region further comprises:
- 30 forming a first area of first dopant concentration by performing a first area implant; and

forming a second area of second dopant concentration different than the first dopant concentration by performing a second area implant, the second area implant is laterally offset from the first area.

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4. The method of claim 1 further comprising:

forming a second island of field oxide at the top surface of the substrate, within the first region, and laterally separated from the first island of field oxide.

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5. The method of claim 4, further comprising forming a gate region overlying the first island of field oxide.

6. The method of claim 4, further comprising forming a conductive region overlying the second island of field oxide.

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7. The method of claim 1, further comprising implanting additional regions of the first conductivity type into the first region.

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8. The method of claim 1, further comprising forming a diffused region of the first conductivity type.

9. The method of claim 8, further comprising forming a source diffusion region in the diffused region of the first conductivity type.

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10. The method of claim 1, further comprising forming a drain diffusion region at the surface of the first region.

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11. A method of manufacturing a semiconductor device comprising:

providing a substrate of a first conductivity type;

5 forming a first region of a second conductivity type within the substrate;

disposing a first island of dielectric material at a top of the substrate within the first region;

10 implanting a second region of a first conductivity type in the first region adjacent to the first island of dielectric material; and

disposing an insulating layer over the second region having a thickness less than the first island of dielectric material.

15 12. The method of claim 11, wherein the step of forming a first region further comprises:

forming a first area of first dopant concentration by performing a first area implant; and

20 forming a second area of second dopant concentration different than the first dopant concentration by performing a second area implant, the second area implant is laterally offset from the first area.

13. The method of claim 11 further comprising:
forming a second island of dielectric material at
the top surface of the substrate, within the first region
and laterally separated from the first island of
5 dielectric material.

14. The method of claim 11, further comprising
implanting additional regions of the first conductivity
type into the first region.

10 15. A method of manufacturing a semiconductor device
comprising:
providing a substrate of a first conductivity type;
forming a first region of a second conductivity type
15 within the substrate;
disposing a first island of dielectric material at a
top of the substrate within the first region; and
disposing a second island of dielectric material at
a top of the substrate within the first region laterally
20 separated from the first island of dielectric material;
and
implanting a second region of a first conductivity
type in the first region between the first and second
islands of dielectric material.

25 16. The method of claim 15, further comprising forming a
conductive gate region overlying the first island of
field oxide.

30 17. The method of claim 16, further comprising forming a
conductive region overlying the second island of field
oxide.

18. The method of claim 15, wherein the step of forming a first region further comprises:

forming a first area of first dopant concentration
5 by performing a first area implant; and

forming a second area of second dopant concentration different than the first dopant concentration by performing a second area implant, the second area implant is laterally offset from the first area.

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19. The method of claim 16, further comprising
implanting additional regions of the first conductivity
type into the first region.

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20. The method of claim 15 further comprising:

applying an insulating layer over the semiconductor device, the insulating layer having a thickness less than the first island of dielectric material; and

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implanting the second region of the second conductivity type through the insulating layer.